From Classroom to Rooftop: An Experience Report from DEVISE4KE

In three years, DEVISE4KE took three rural Kenyan schools from unreliable power and almost no digital teaching to solar-powered classrooms where 18 teachers designed and taught their own digital learning tasks. This report tells what we did, what changed, what was hard, and what we would advise others.

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Project	DEVISE4KE, Erasmus+ Capacity Building in VET, December 2023 – November 2026
Partners	University of Bremen (DE), Warnborough College (IE), Maristak Durango (ES), Rongo University (KE)
Schools	Kiabuya, Miramba and St Joseph Olando Mixed Secondary Schools, Homa Bay County
Platforms	EPALE (blog and resource); European Digital Education Hub (Sharing is Caring)

Summary. DEVISE4KE combined three things that rarely arrive together: energy, equipment and teacher development. Solar systems gave the schools reliable power. Tablets, projectors and an offline server made digital teaching possible. A teacher pathway of workshops on digital teaching and learning and Learning and Work Tasks improved their digital competences and turned them into capable designers of digital, work-based lessons. Teachers' self-assessed digital competence rose in all five DigComp 2.2 areas. Rongo University built the approach into accredited teacher training. Staff turnover, large classes and long-term maintenance remain open challenges.

Keywords: experience report; teacher professional development; digital competence; DigComp 2.2; solar energy; work-based learning; Erasmus+ CBVET; Kenya

1. Where we started

The three schools faced the same six barriers at the start of the project (Mulwa, 2026):

- erratic and unreliable power from the national grid
- too little, and inefficient, ICT equipment
- little or no internet connectivity
- low ICT skills among teachers and students
- few development programmes to reskill teachers
- growing demand from employers for ICT-competent staff

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To understand the gap precisely, we ran a needs analysis in 2024. We interviewed 10 regional employers across five sectors, assessed 23 teachers against DigComp 2.2, and surveyed 247 students (Harberts, Ng & Kaune, 2026). Employers rated the importance of digital competences at 70–85% of the DigComp proficiency scale. Teachers rated themselves at 15–40%. Students had little or no access to devices, so the gap was structural, not a lack of motivation: 88% said they were interested in learning digital skills.

These findings echo earlier research in the county. Studies of Kenya's Digital Literacy Programme in Homa Bay found limited teacher computer capacity and many schools not yet teaching with the devices they had received (Omito et al., 2019; Omito, 2021).

The policy context added pressure. Kenya's Competency-Based Education (in 2024 Competency-Based Curriculum) asks teachers to facilitate practical, project-based learning and to assess competences, not only knowledge. Most teachers had been trained for a different system.

2. What we did

We worked in a logical order: power first, then we started teacher training and set up devices, which partly was complimentary and building up on each other and:

1. **Power.** Photovoltaic systems with inverters were installed at the schools and at Rongo University. Installation was itself a learning task: teachers and students planned the system, calculated needs and costs, and defined a maintenance plan before anything went on the roof.
2. **Devices and network.** The schools received tablets, projectors and Wi-Fi/LAN equipment, plus a Raspberry Pi server for offline teaching. Rongo University opened an equipment rental platform for other schools.
3. **Teacher pathway.** Teachers attended training weeks in Kenya and Germany. They learned to use the devices, prepare subject content, deliver it digitally and evaluate learning (Mulwa, 2026). They then worked through Learning and Work Tasks as learners, before designing their own for their students.
4. **Pilots.** Teachers taught their tasks to their own classes, with project partners observing and collecting feedback.

How we kept it grounded: design-based research

Every product went through repeated cycles of design, testing, evaluation and revision (McKenney & Reeves, 2019). Tasks were first tried at Rongo University with university staff, then at the three schools, then at further schools. Each cycle fed changes into the next version. The same approach ran on two tracks at once: the partners' tasks for teachers, and the teachers' tasks for students.

Why DigComp, not DigCompEdu

We chose the DigComp 2.2 framework for citizens over the DigCompEdu framework for educators (Vuorikari, Kluzer & Punie, 2022; Redecker, 2017). DigCompEdu assumes a baseline of digital competence most of our teachers did not have. DigComp let teachers and students start the same learning journey in the same five areas.

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3. What changed

18 teachers completed the full pathway and produced competence-based digital LWTs. Two of the three schools had no ICT-trained teachers when the project began (Harberts, Ng & Kaune, 2026).

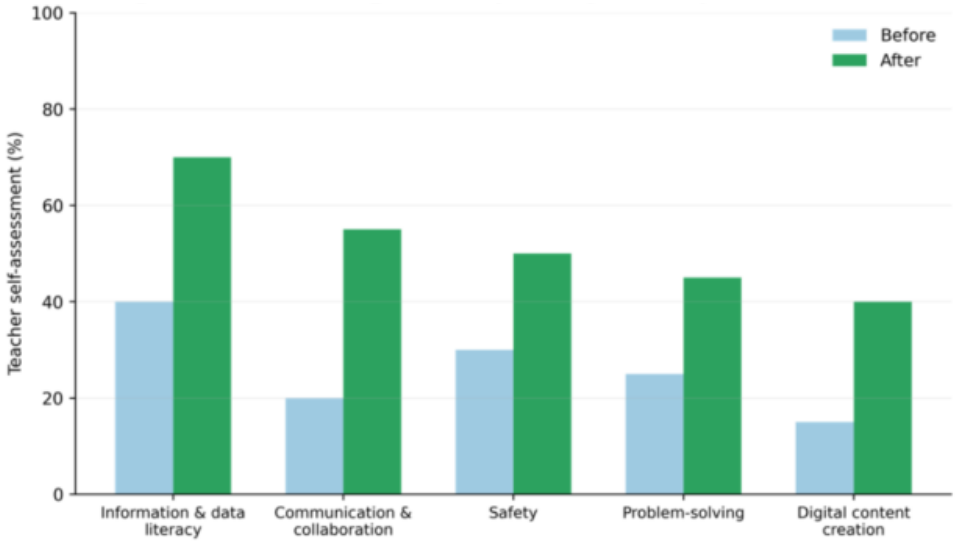


Figure 1: Teacher Digital Competency Development

Between January 2024 and the end of the pilot in June 2026, teachers' self-assessed competence rose by 20 to 35 points in every DigComp area. Information and data literacy reached the level employers asked for. Digital content creation, the area employers rated highest, still shows the largest gap.

Teaching practice: from "hardly able" to "can do this"

The biggest change was pedagogical. On a four-point scale (1 = confident, 4 = hardly able), teachers rated themselves 4 on every competence-oriented teaching skill at the start. After the pilot they rated four of the five skills at 2.

4-point Likert Scale: 1 = confident → 4 = hardly able

Pedagogical Competence	Before (01.2024)	After (06.2026)
Planning work-based learning opportunities in classes	4 (hardly able)	2 (can do this)
Designing digital learning and work tasks	4 (hardly able)	2 (can do this)
Designing learning outcomes based on real-world problems	4 (hardly able)	2 (can do this)
Encouraging active and collaborative learning	4 (hardly able)	2 (can do this)
Planning digital classes	4 (hardly able)	3 (struggling)

Figure 2: Pedagogical Self-Assessment of Homa-Bay Teachers

These are the skills the Competency-Based Education asks of teachers, and the ones the LWT pathway trained directly. Planning digital lessons in general improved least. This fits the remaining gap in digital

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content creation above: teachers can now design a structured digital task, but building digital material from scratch is still hard.

In the classroom

From April 2026, six teachers piloted their tasks with students. At Miramba, students completed DigComp-based tasks in a pilot on 27 April. At St Joseph Olando, teachers ran their own LWTs at the end of April. "It is very encouraging to see students use technology," said lead LWT developer Dishon Gunga (DEVISE4KE, 2026b). Four of the teacher-designed tasks are published in English and Kiswahili for reuse (DEVISE4KE, 2026a).

At Rongo University

The Kenyan university partner built the project into its own programmes (Mulwa, 2026):

- digital literacy integrated into its teacher training curriculum and accredited through Kenya's Commission for University Education
- the BSc in IT revised to include AI and cybersecurity, from the September 2026 intake
- a new master's in AI and Data Science, with six applicants for 2026
- free digital literacy clinics for school leavers, including entrepreneurial skills for online work

Rongo's own assessment is that the project addresses six of the seven core competencies of Kenya's Competency-Based Curriculum.

Beyond Homa Bay

Results were shared at Rongo University's international conference (May 2026), the final conference at Maristak Durango, Spain (23 September 2026), and the online EDvance Summit (8 October 2026), which drew over 300 registrations.

4. What was hard

The biggest risk to the results is not technology but people leaving. Our Kenyan partner named five challenges that emerged during the project (Mulwa, 2026):

- **Staff mobility.** Trained teachers transfer to other schools, taking their skills with them.
- **Scaling with few resources.** Extending the approach to more schools needs funding the region does not have.
- **Equipment against class size.** A set of tablets does not go far in large classes.
- **Fast technological change.** AI tools change what digital competence means while training is under way.
- **Online safety for minors.** Connecting students raises cybersecurity risks that schools are not yet equipped to manage.

Our research has its own limits. The employer and teacher samples are local and not statistically representative. Competence data are self-assessments. Evidence on student competence gains from the pilots is still being analysed. And whether equipment and content are maintained after the project ends cannot yet be tested (Harberts, Ng & Kaune, 2026).

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One condition proved non-negotiable: reliable electricity. Without the solar installations, no part of the teacher pathway would have worked. This is in line with UNESCO's conclusion that access, governance and teacher preparation must all be in place before technology can add value to education (UNESCO, 2023).

5. Lessons for adult educators and project teams

Teachers are adult learners, and the pathway worked because it treated them that way. The features that made the difference match what research identifies in effective professional development: active learning, collaboration, models of good practice, coaching and feedback, and sustained time (Darling-Hammond, Hyler & Gardner, 2017).

For teacher trainers and adult educators

1. **Let learners experience the method before they teach it.** Completing an LWT as learners gave teachers a concrete model for the tasks they then wrote.
2. **Make the product the training.** Writing a real task for one's own class worked as professional development in itself (Harberts, Ng & Kaune, 2026).
3. **Start where people are.** A citizens' framework (DigComp) worked better than an educators' framework for teachers with low starting competence.
4. **Train in teams, not individuals.** With high staff turnover, knowledge must sit with several people per school.

For Erasmus+ capacity-building projects

1. **Sequence the investment.** Power, then devices and people
2. **Let the local partner lead the agenda.** The baseline challenges came from Rongo University and the schools, and so did the most lasting results.
3. **Build in an institutional home early.** Rongo's accredited curriculum and rental platform will carry the work after funding ends.
4. **Budget for iteration.** Design-based research cycles take time, but every cycle improved the tasks.

Over to you. How do you keep trained staff, and their knowledge, in rural or small institutions? We would like to hear what has worked for you.

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What changed: 18 teachers completed the pathway; self-assessed competence rose in all five DigComp 2.2 areas; on planning work-based learning and designing digital tasks, teachers moved from "hardly able" to "can do this"; Rongo University now offers accredited digital literacy in teacher training.

Lessons you can take forward:

- Sequence the investment: power, then devices, then people.
- Make the product the training: teachers learn most by writing a real task for their class.
- Train teams, not individuals, to survive staff turnover.
- Give the work an institutional home before funding ends.

Let's continue: planning a capacity-building project in a low-connectivity setting? We are happy to share our materials and to co-design. Comment below or contact harberts@uni-bremen.de.

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